Modelling Interactions between Plants and Bioagressors. Mathematical Perspectives.

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In many countries around the world, and in particular in Southern countries, the food demand is increasing while arable lands are reducing or being more and more impacted by bioagressors (pests and pathogens), due, partly, to climate change. Many farmers cannot use pesticides due to their prohibitive price and because their usage is banned or more and more restricted. Thus, it is crucial to develop and study new biological control approaches. In fact, Crop protection is a challenging domain of research, even for mathematicians. Many experiments have been or are conducted around the world to test different innovative Bioagressors control tools or strategies. However, these experiments are often located in one place, they are expansive, difficult to conduct and to reproduce, ..., and, according to some crops (perennial crops), may take several years.... Mathematical Modelling and Simulations can be of great help to study these (complex) systems in close connexion with the experiments.

In this talk I will present different examples, based on ongoing works, where Mathematics can be helpfull and bring new insights about Plant-Bioagressors interactions. In particular modelling plant epidemiology or/and plant-insect interactions may lead to novel and challenging mathematical problems, from the theoretical and numerical point of view... with, in addition, pratical applications.